occurs while the user of a device associated with a limb is in a still position, perhaps standing, sitting, or lying down. Dynamic alignment, on the other hand, is alignment based on measurements that represent user dynamics during gait, either normal level ground gait or more complex situations. In general, the term "alignment" is used both to indicate the actual adjustment of the intelligent device by the movement of parts and to indicate the analysis or process of determining how to configure the movable parts.

[0053] A device associated with a limb is any device that may be used to assist the limb in some function. For instance, a prosthetic device is a device associated with a limb. A prosthetic device may replace a portion of or the entire limb. Alternatively, an orthotic device is a device associated with a limb. An orthotic device, for instance, supports or aligns the limb. Additionally, other devices, such as articles of clothing or sporting goods equipment, may be devices associated with a limb. For instance, a shoe is a device associated with a limb because it assists the user of the shoe to use the foot, for example, to walk or run. Similarly, a ski boot is a device associated with a limb because it assists the user of the ski boot to use the foot, for example, to ski.

[0054] A bending force sensor is a sensor that measures bending force. One example of a bending force sensor is a variable printed resistor on a thin flexible substrate. As the substrate is bent, the sensor produces a resistance output correlated to the bend radius. That is, the smaller the radius, the higher the resistance value. Thus, a bending force sensor may be a sensor that bends.

[0055] A force characteristic of a device is any characteristic indicative of a force associated with the device. The force may be an external force, such as pressure applied to the device, for instance, when a prosthetic foot makes contact with the ground while a user is walking. A force may also be an internal force, such as the resistance of a conductive material with which the device is comprised. A force characteristic may be derived from other measurements and may form the basis for other derived measurements. For instance, a force characteristic may be the amount of bending experienced by a component of the device. This measured bending may be determined, for instance, by measuring the resistance of the component. Moreover, the measured bending, or resistance, may be used to measure whether the user of the device, such as a prosthetic foot, has entered a certain state of use, such as a heel strike state in the gait of the device user.

[0056] The phrase "suitable working condition" as used herein is intended to indicate a number of conditions relating to the proper and optimal use of a device associated with a limb. For instance, operating in proper alignment, operating within safety parameters, and operating without foreseeable internal failure are all examples of suitable working conditions of a device associated with a limb. When a device is not properly aligned, for instance, it is not in suitable working condition.

[0057] The term "biomechanical" as used herein refers to any mechanical characteristic or property of a device associated with the mechanics of a living body. For instance, the alignment of a device associated with a limb is a mechanical characteristic of a device associated with the mechanics of a living body. Similarly, the bending of a device associated with a limb is a biomechanical property. Measuring whether certain bending indicates delamination or otherwise deterioration of a device associated with a limb is a biomechanical measurement because the delamination will change the mechanical response of the device and thus affects the way the device will interfere with the limb. Internal and external forces, such as pressure loads, experienced by a device associated with a limb are also biomechanical characteristics of the device. Certain angles of biomechanical joints could in theory be calculated from the bending characteristics of a device and the angles are thus also regarded as biomechanical properties.

[0058] The term "predetermined" as used herein refers to any property, function, value, etc. determined at a prior period of time to application. For instance, a threshold value, algorithm, or status condition used to evaluate measurements taken on a device associated with a limb may all be predetermined. Some predetermined algorithms, conditions, values, variables, functions, etc. are used to calculate other values, etc. on the fly. Thus, a predetermined range may be understood both as a range of numbers that were selected previously (that is, that were predetermined) and as a range of numbers determined dynamically by a predetermined algorithm. The same is true of a predetermined threshold.

[0059] The phrase "user interface" as used herein means any means for perceiving the readings of the sensors of an intelligent device. For instance, a user interface may comprise an LCD monitor of a computer that is attached to an intelligent prosthetic foot. Alternatively, a user interface may be an LED indicator mounted on an intelligent prosthetic foot. In other embodiments, a user interface may comprise sound signals transmitted to the user of an intelligent foot and received through headphones. It will be appreciated that there are many ways in which the information from the sensor system may be communicated to a user or a third party. The phrase "user interface" should not be construed to be restricted to users. Thus, a trained prosthetist may be the intended user of a user interface.

[0060] A performance characteristic is any characteristic particular to the performance of a device. For instance, one example of a performance characteristic is the bending of a device, such as the bending of a prosthetic foot, an orthotic foot, or a shoe. Moreover, a performance characteristic may measure a force, more particularly a bending force. Additionally, a performance characteristic may measure a load, more particularly a bending load. A single performance characteristic, however, may be used to detect multiple conditions. For instance, a resistive strip may be used to measure the performance characteristic of bending, which may in turn be used to determine the position of the foot relative to the ground. Accordingly, a certain degree of bending of the resistive strip may indicate that the prosthetic foot in which the resistive strip is embedded is in a heel strike position, or a toe load position, or a position in-between. Thus, a performance characteristic, such as bending, may be used to measure multiple conditions, such as heel strike, toe load, or an in-between condition. Furthermore, a performance characteristic may be combined with other performance characteristics to determine a particular condition or value. For instance, two resistive strips may be aligned in a prosthetic foot to give data concerning the bending characteristic of both the left and right portions of